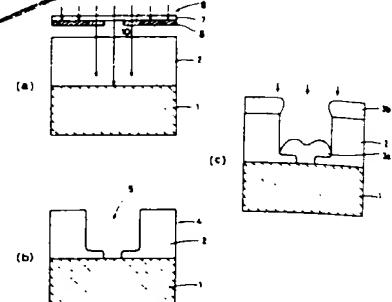


## (54) FORMATION OF DEPOSITED FILM

(11) 2-222536 (A) (43) 5.9.1990 (19) JP  
 (21) Appl. No. 64-44715 (22) 23.2.1989  
 (71) ROHM CO LTD (72) HITOSHI HOSONO  
 (51) Int. Cl<sup>s</sup>. H01L21/306, H01L21.027

**PURPOSE:** To make it possible to form a deposited film whose contact area with a substrate is small and whose volume is large, in a few number of processes, by a method wherein a hole, which is larger on the side of its opening and is smaller on the side of the substrate, is formed in a resist by exposing the resist to light through a photomask having a light-semishielding part.

**CONSTITUTION:** A resist 2 is formed on a substrate 1 and the above resist 2 is exposed to light through a photomask 6, which has a part 10 of a high light transmittance, a light-semishielding part (a light-semishielding member) 9, by which an incident light is weakened and outputted, and a part 8, with which light is completely shielded. Thereby, a hole 5, which is large on the side of its opening and is small on the side of the substrate, is formed in the above resist 2. After that, a metal is deposited on the above substrate 1 through a resist pattern 4, in which the above hole 5 is formed, to form a deposited film 3a. For example, the above part 9 consists of a porous photoresist, an emulsion mask adjusted so as to become a mask of a halftone or a material identical with that for the light-shielding part 8 and is constituted of a fine pattern less than a resolution limit of the resist 2 on the substrate 1 and the like.



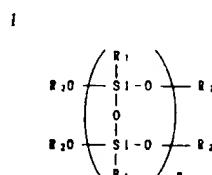
7: light-transmitting substrate. 3b: metal film

## (54) METHOD OF TRANSFERRING PATTERN ON SILICONE LADDER RESIN AND ETCHING LIQUID TO BE USED THEREFOR

(11) 2-222537 (A) (43) 5.9.1990 (19) JP  
 (21) Appl. No. 64-44326 (22) 23.2.1989  
 (71) MITSUBISHI ELECTRIC CORP (72) HIROSHI ADACHI(3)  
 (51) Int. Cl<sup>s</sup>. H01L21/308, B05D7/24, G03F7/075//B05D3/06, C09K13/06, G03F7/26

**PURPOSE:** To obtain a wet etching method, which can be applied even to a thick film in a short time and in which a stable transfer of a pattern is possible, by a method wherein after a specified silicone ladder resin is applied and dried on a substrate, a cresol novolak P-type resist is applied to form a pattern, then, after a treatment is performed, the resin is etched.

**CONSTITUTION:** A silicone ladder resin, which is represented by a general formula (I) (in the formula, R<sub>1</sub> is a phenyl radical or a lower alkyl group, two pieces of the R<sub>1</sub>'s can be similar or dissimilar, R<sub>2</sub> is an hydrogen atom or a lower alkyl group, four pieces of the R<sub>2</sub>'s can be similar or dissimilar and (n) shows an integer of 5 to 1000), is applied and dried on a substrate and thereafter, a cresol novolak P-type resist is applied and a prescribed pattern is formed on the resist. Then, after a treatment is performed prior to an etching, the silicone ladder resin is etched. For example, as a pretreatment for the above etching, the silicone ladder resin is heated for 15 to 60 minutes at 125 to 160°C and, thereafter, is held for 3 hours or longer at a room temperature. Moreover, an aromatic solvent is used as an etching liquid in the above etching.



## (54) FORMATION OF COVER FILM FOR Al WIRING

(11) 2-222538 (A) (43) 5.9.1990 (19) JP  
 (21) Appl. No. 64-44569 (22) 23.2.1989  
 (71) NEC CORP (72) AKIO TANIGAWA  
 (51) Int. Cl<sup>s</sup>. H01L21/316

**PURPOSE:** To obtain an Al wiring, in which no void is generated even if the wiring is exposed to a temperatures of 400 to 500°C, of the integrated circuit of a semiconductor device by a method wherein element ions, which are gas at normal temperatures, or a neutral corpuscular beam are/is irradiated on the surface of a two-layer cover film consisting of a silicon nitride film and an SiO<sub>2</sub> glass film.

**CONSTITUTION:** Element ions, which are gas at normal temperatures, or a neutral corpuscular beam are/is irradiated on the surface of a two-layer cover film consisting of a silicon nitride film 5 and an SiO<sub>2</sub> glass film 4. For example, an Si film containing 1% of Al is formed on a substrate 2 having an interlayer insulating film 1 and thereafter, after a wiring pattern 3 is formed by a photoresist process and a dry etching process, a phosphorus glass film 4 and a silicon nitride film 5 are respectively deposited in a thickness of 1μm and a thickness of 0.3μm by a CVD method and a plasma CVD method. After that, if Ar<sup>+</sup> ions of an accelerating voltage of 30kV are irradiated in 1 × 10<sup>16</sup> cm<sup>-2</sup> from the surface of a wafer, fine bubbles 6 are formed in the layer of the film 4. Thereby, the tensile stress of the film 5 is relaxed by the fine bubbles in the film 4 and the generation of voids, which are generated in an Al wiring, can be prevented.

